

LISTING OF THE CLAIMS

Please amend claims 1, 6 and 11. This listing of claims will replace all prior versions, and listings, of claims in the application:

CLAIMS

What is claimed is:

1. (Currently Amended) A semiconductor laser, comprising:
a first optical gain element that generates a first light beam having a first optical frequency;
a second optical gain element that generates a second light beam having a second optical frequency;
an optical frequency mixer that is coupled to said first and second gain elements and mixes said first and second light beams to generates a polarization wave at a third optical frequency; and
a near-field phase grating that phase modulates the polarization wave to couples a power from the polarization wave to an electromagnetic wave that propagates ~~propagating~~ at the third optical frequency.
2. (Original) The laser of claim 1, wherein the third optical frequency is in the mid-infrared, long-infrared or Terahertz regions.
3. (Original) The laser of claim 1, wherein said optical frequency mixer includes a waveguide optically coupled to said first and second gain elements.

4. (Original) The laser of claim 1, wherein the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.

5. (Original) The laser of claim 1, wherein the semiconductor laser is fabricated with group III-V material.

6. (Currently Amended) A semiconductor laser, comprising:
a first optical gain element that generates a first light beam having a first frequency;
a second optical gain element that generates a second light beam having a second frequency;
mixing means for mixing the ~~two~~first and second light beams to create a polarization wave at a third optical frequency, and;
phase modulation means for phase modulating the polarization wave for coupling a
power of the polarization wave to an electromagnetic wave that propagates ~~propagating~~ at the third optical frequency.

7. (Original) The laser of claim 6, wherein the third optical frequency is in mid-infrared, long-infrared or Terahertz regions.

8. (Original) The laser of claim 6, wherein said mixing means includes a waveguide for mixing said first and second light beams.

9. (Original) The laser of claim 6, wherein the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.

10. (Original) The laser of claim 6, wherein the semiconductor laser is fabricated with group III-V material.

11. (Currently Amended) A method for operating a semiconductor laser, comprising:
generating a first light beam having a first optical frequency;
generating a second light beam having a second optical frequency;
mixing the two first and second light beams to create a polarization wave at a third optical frequency, and,

~~coupling~~phase modulating the polarization wave to couple a power of the polarization wave to an electromagnetic wave ~~propagating~~ that propagates at the third optical frequency.

12. (Original) The method of claim 11, wherein the third optical frequency is in the mid-infrared, long-infrared or Terahertz regions.

13. (Original) The method of claim 11, wherein the first and second light beams are mixed in a waveguide.

14. (Original) The method of claim 11, wherein the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.